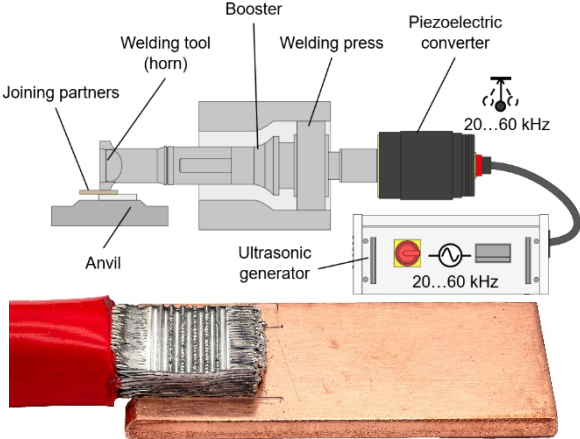


Assignment of a Topic for a Master's Thesis

Topic:	Influence of Contamination on the Ultrasonic Welding Performance of Aluminum and Copper Stranded Wires
Content:	<p>Description: Ultrasonic metal welding (USMW) is a solid-state welding technology used primarily in electrical and electronic applications, including wire connections for modern automobiles. From the manufacturing to the welding process, stranded wires are subjected to numerous potential influences that affect their final state and welding quality, such as the time-dependent formation of oxide layers and contamination during production, transportation, and storage. The proposed research is focused on the influence of contaminations and oxide layer properties on the ultrasonic welding quality of aluminum and copper stranded wires. The research involves systematic storage of the wires under different environmental conditions to study the influence of contamination sources (temperature, humidity, insulation materials degradation) on the welding quality.</p>  <p>The diagram illustrates the ultrasonic welding process. It shows 'Joining partners' (two metal pieces) being held together by a 'Welding tool (horn)' and a 'Welding press'. This assembly is connected to a 'Piezoelectric converter' which is driven by an 'Ultrasonic generator' (20...60 kHz). A 'Booster' is also shown between the generator and the welding press. A photograph below shows a red wire being welded to a copper wire on a wooden block.</p> <p>Tasks:</p> <ul style="list-style-type: none"> - Literature review on the state of the art - Storage of the wire samples according to the selected conditions - Conducting ultrasonic welding of the wires after storage - Performing sample preparation after welding as well as microscopic investigations - Characterization of microstructure, surface composition of the samples - Identification of the contamination sources as well as their influence on the welding process and properties after welding <p>The thesis language is English, therefore good language skills as well as the ability to write and present thesis results in English is necessary.</p>
Requirements:	<ul style="list-style-type: none"> - Students with completed Bachelor's degree in Mechanical Engineering, Materials Science or related fields - Good knowledge of materials science and joining technologies as well as statistical evaluation methods and analysis - Knowledge of materials characterization methods with hands-on experience will be an advantage - Good English skills are required <p>Please submit your complete application documents (cover letter, CV, certificates) by email.</p>
Contact:	<p>Dr. Dmitrii Ozherelkov</p> <p>Professur Verbundwerkstoffe und Werkstoffverbunde E-Mail: dmitrii.ozherelkov@mb.tu-chemnitz.de</p>